

CLAIMS

What is claimed is:

1. A reversible thermochromic system comprising an electron donating compound and an electron accepting compound, wherein the combination of the electron donating compound and the electron accepting compound is reversibly thermochromic and a color change is detectable by the human eye, colorimetric measurement, or both.
2. The system of claim 1, wherein the electron donating compound is a spirolactone.
3. The system of claim 2, wherein the electron donating compound is a phthalide derivative.
4. The system of claim 1, wherein the electron donating compound is selected from the group consisting of as 3-(2,2-bis(1-ethyl-2-methylindol-3-yl)vinyl)-3-(4-diethylaminophenyl)-phthalide; 3-(4-diethylamino-2-ethoxyphenyl)-3-(1-ethyl-2-methylindol-3-yl)-4-azaphthalide; 3,3-bis(4-diethylamino-2-ethoxyphenyl)-4-azaphthalide; and 3,3-bis(1-n-octyl-2-methyl-indol-3-yl)phthalide, and combinations thereof.
5. The system of claim 1, wherein the electron accepting compound comprises a long-chain aliphatic carboxylic acid having at least 11 carbons in the aliphatic chain.
6. The system of claim 5, wherein the electron accepting compound is non-branched, or non-grafted, or both.
7. The system of claim 5, wherein the electron accepting compound has a pKa value between about 4.0 and about 6.0.
8. The system of claim 5, wherein the electron accepting compound is selected from the group consisting of arachidic acid, stearic acid, pentadecanoic acid, myristic acid, tridecanoic acid, dodecanoic acid, and a mixture thereof.

9. The system of claim 1, wherein the weight ratio of the electron donating compound to the electron accepting compound is about 0.1 to about 2.
10. The system of claim 1 further comprising a pigment.
11. A printing ink comprising the reversible thermochromic system of claim 1.
12. The printing ink of claim 11, wherein the ink is a flexographic printing ink, a screen printing ink, a lithographic printing ink, or an intaglio printing ink.
13. A printing ink comprising the reversible thermochromic system of claim 10.
14. The printing ink of claim 13, wherein the ink is a flexographic printing ink, a screen printing ink, a lithographic printing ink, or an intaglio printing ink.
15. A method for preparing a reversible thermochromic system comprising combining an electron donating compound and an electron accepting compound, wherein the combination of the electron donating compound and the electron accepting compound is reversibly thermochromic.
16. The method of claim 15, wherein the system changes from a first color to a second color as the temperature of the system increases and changes from the second color to the first color as the temperature of the system decreases.
17. The method of claim 16, wherein the first color is colorless.
18. The method of claim 16, wherein the first color is a color.
19. The method of claim 16, wherein the second color is a color.
20. The method of claim 16, wherein the second color has a higher intensity than an intensity of the first color.